District Approaches to Tools For Schools Implementation
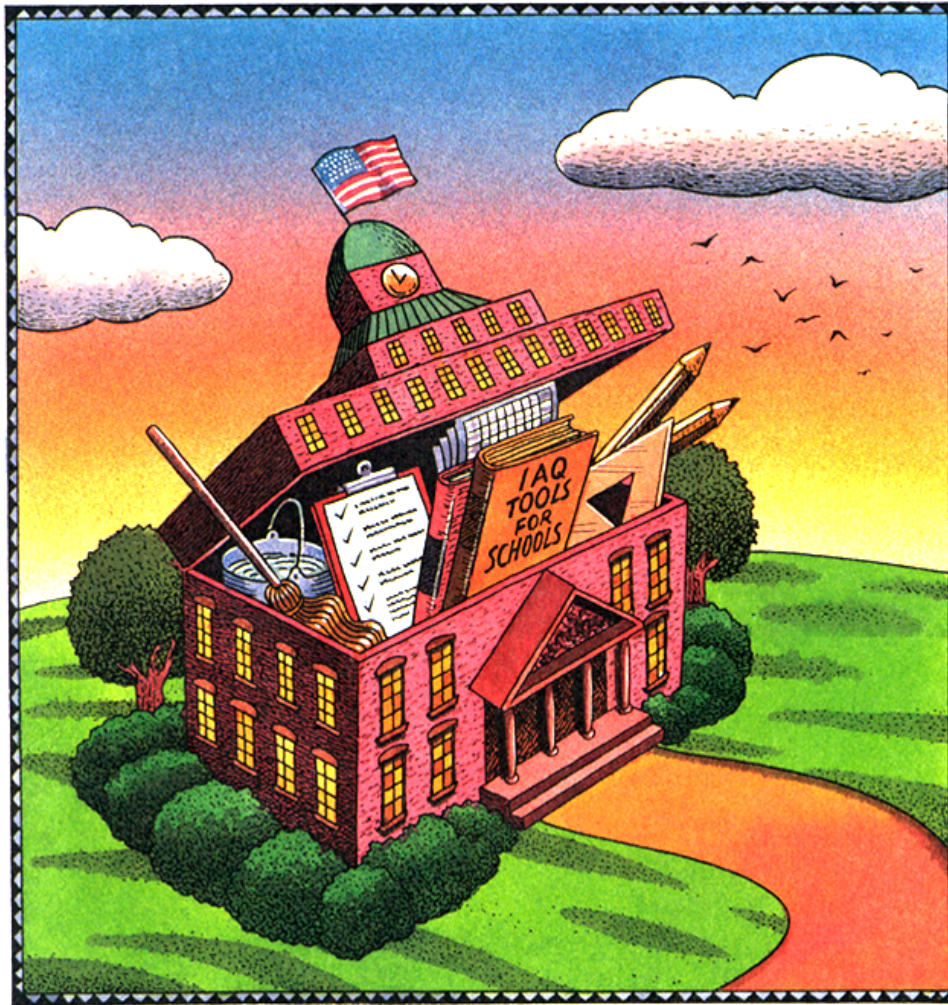
The University of Tulsa

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University of Tulsa Indoor Air Program

- Initiated in 1987
- National IAQ Conference Organization
- Conducted research related to IAQ in schools nationally and internationally
- On-going research on all facets of IAQ
- Outreach and work on behalf of EPA since 1990

TFS Implementation assisted by Univ. of Tulsa

- Tulsa, OK Public Schools (98 Schools)
- Helena, MT Public Schools (19 Schools)
- Salt Lake City, UT Schools (40 Schools)
- Washoe County, NV Schools (85 Schools)
- Lee County, FL Schools (68 Schools)

TFS in Progress

- Mesquite, TX School District (42 Schools)
- Charlotte-Mecklenburg, NC (150 Schools)
- Adams, CO 12 Schools (46 Schools)
- Fresno, CA Public Schools (91 Schools)
- Oklahoma City, OK Schools (76 Schools)
- Jefferson County, CO Schools (137 Schools)

TFS Multi-School Program

- Union Public Schools (14 Schools)
- Jenks Public Schools (11 Schools)
- Blackwell Public Schools (7 Schools)
- Bixby Public Schools (6 Schools)
- Tahlequah Public Schools (5 Schools)
- Bristow Public Schools (4 Schools)

How to make TFS "ideal" for your District

Information gathering process

Designed with "Flexibility"

Educational for all

Administrated as a TEAM effort

Long-term Results

Information Gathering

- Team Representation
- Floor Plans (Plots) of Each School
- Occupant Checklists
- Ventilation Checklists
- Walk-through Data Forms

Designed with "Flexibility"

- Staff Availability
  - Varies greatly from district to district
- Funding
  - Budget reductions are a fact of life
- Cooperation Factor
  - Working as a team
- Make the program work for you

Educational for All

- Students
- Teachers
- Parents
- Site and District Administration
- Site and District Maintenance

Administration

- Program Design
  - What best suits an individual district?
- Training
  - For District Personnel in Data Collection and Validation
- Support
  - Data assembly and reports

Long-Term Results

- Improved IAQ can result in
  - Increased Comfort in the Classroom
  - Reduced Health Complaints
  - Increased Learning Potential
  - Reduced Liability from Litigation
  - Improved Staff/Administration Relations
  - Improved School/Community Relations

So Where Do We Start?

Phase 1

Phase 2

Phase 3

Jan   Feb   Mar   Apr   May   Jun   July   Sep   Oct   Nov   Dec
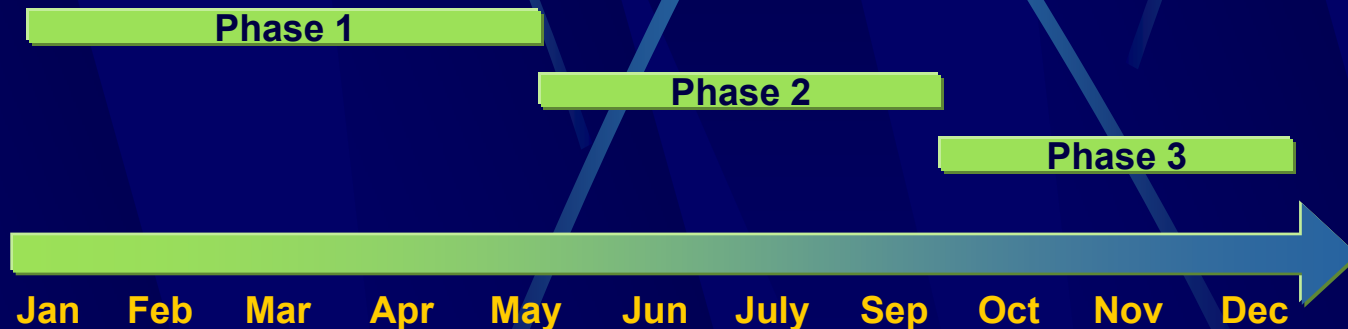
Commitment

- Acceptance by the District for Implementation of Tools for Schools

- Written agreement to participate in the Program as district resources allow

Letter of Intent

Date

EPA Region _
1445 Clean Air Drive
IAQ, USA 75202-2733

Dear :

The _____ School District is looking forward to participating in EPA's Tools for Schools Program. We plan to engage in the program with the assistance of The University of Tulsa and we expect a successful implementation throughout the _____ School District.

Sincerely,

(School superintendent signature, typed title)

Training

- Instills principles of TFS Program
- Benefits of the Program
- Delineates Roles of *all* parties
- Open discussion of district capabilities
- Realistic goals to be achieved through TFS

Develop a Building Profile (checklists)

- **Building envelope**
- **Outdoor pollutant sources**
- **Indoor pollutant sources**
- **HVAC System**
- **Human activities**
- **House keeping**
- **Pest control**
- **Existing complaints, practices, and related activities**
- **Baseline data collection**

Floor Plan

- Required for each School
  - Current and Accurate

- Each room identified by room #

- Ventilation zones must be included

Occupant Checklist

- Introduction letter included with the checklist form when distributed to occupants

- Provides staff with a method to report observations about their daily work area

- Begins the Team building process

Letter of Introduction

- Encourages maximum participation of the Staff in the TFS program
- Written specifically for each District
- Explains the basis for the occupancy checklists
- Long Term program; checklists are first step in developing baseline for school

Letter of Introduction

SUBJECT: School Indoor Air Quality Occupant Checklists

Dear Principal, Teachers and all school staff:

The Tools for Schools Program identifies roles for both district maintenance staff and for school occupants and explains the importance of communication between district and school occupants. **Through the use of checklists, questionnaires and site walk-throughs, a database will be developed of school conditions and activities to be addressed, some of which can be corrected quickly while others will have to be prioritized in the long term.** EPA explained that in their experience many IAQ problems can be corrected with education, communication and recognition; some take time and money and others - well ... more of both. However, the key is to recognize these and to begin a directed program. That program is now beginning.

One of the first steps in the process is having teachers from each classroom fill out an "occupant checklist". The checklists will be sorted and answers recorded to establish a baseline of conditions existing at each school. Identify the room number you are in, and then fill out the checklist. Please select "Y" if the statement is correct, "N" if there is a problem in your room, or "N/A" if the statement does not apply to your room. If you select an "N" or no answer, comments are welcomed to clarify the response. Please note that the more information you include in the checklists, the better we are able to develop the overall response plan for the school.

IAQ Occupant Checklist

Room #:_____   **School Name:** _____

General Cleanliness

(Yes)	(No)	(Not Applicable)	
❏Y	❏N	❏N /A	Classroom is free of clutter.
❏Y	❏N	❏N /A	Classroom is dusted and vacuumed thoroughly and regularly.
❏Y	❏N	❏N /A	Trash is removed daily.
❏Y	❏N	❏N /A	Classroom free of food kept overnight.
❏Y	❏N	❏N /A	Animal food, if any, is stored in tightly sealed containers.
❏Y	❏N	❏N /A	Room is free of pests.
❏Y	❏N	❏N /A	Carpet (if any) is kept clean & free of moisture.
❏Y	❏N	❏N /A	Spills are thoroughly cleaned.
❏Y	❏N	❏N /A	Classroom is free of excessive number of plants.
❏Y	❏N	❏N /A	Classroom is free of upholstered furnishings, stuffed animals, etc.
❏Y	❏N	❏N/A	Art and cleaning supplies are properly stored.

Notes: _____

_____

_____

Animals in the Classroom

❏Y	❏N	❏N /A	Animals kept in cages as much as possible; not allowed to roam.
❏Y	❏N	❏N /A	Cages are cleaned regularly.
❏Y	❏N	❏N /A	Animals located away from ventilation system vents
❏Y	❏N	❏N /A	Students have been checked for existing animal allergies
❏Y	❏N	❏N /A	Alternatives to animals used when possible.

Notes: _____

_____

_____

Room Number	22	23	24	25	28	29	30	31	32	33	35	36	37	38	39
General Cleanliness															
Free of Clutter	2	2	2	1	1	1	1	1	2	1	2	2	2	1	2
Dusted/vacuumed	2	1	2	1	1	1	1	1	1	1	2	1	1	1	2
Trash removed	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Free of food kept overnight	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Animal food kept stored properly	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1
Free of pests	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Carpet clean/moisture free	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Spills thoroughly cleaned	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Free of excessive number of plants	1	1	2	1	1	2	1	1	1	1	2	1	1	1	1
Free of upholstery/stuffed animals/etc.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Art/Cleaning supplies are properly stored	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Animals in the Classroom															
Kept in cages	3	3	2	3	3	2	3	3	3	3	3	3	3	3	3
Cages cleaned regularly	3	3	2	3	3	2	3	3	3	3	3	3	3	3	3
Located away from ventilation	3	3	2	3	3	2	3	3	3	3	3	3	3	3	3
Students checked for allergies	3	3	2	3	3	2	3	3	3	3	3	3	3	3	3
Alternatives to animals	3	3	2	3	3	2	3	3	3	3	3	3	3	3	3

Ventilation Checklist

- Ventilation systems must be coded to align with floor plans

- With minimal additional effort they can be completed by Filter Maintenance or PM crews

Rm 36

Rm 35

Rm 37

Rm 38

Rm 33

Rm 39

25

AH-1

AH-2

27

26

Rm 32

Rm 31

Rm 29

28

Rm 28

Library

Rm 22

Rm 23

Rm 24

Rm 25

Rm 29

IAQ Ventilation Log

HVAC Unit Number: _____   School # _____
School Name: _____   Room/Area: _____

Instructions
Each ventilation unit in your school must have a checklist filled out.
Perform the activities on the Checklist for **each** ventilation unit and record your results.
A "No" response requires further attention.

Outdoor Air Intakes
1. □ Y □ N □ N/A   Outdoor air intakes free of obstructions.
2. □ Y □ N □ N/A   Outdoor air intake clear of nearby pollutant sources.
3. □ Y □ N □ N /A   Outdoor air moving into intake.

Notes: _____

Outdoor Air Supply
4. □ Y □ N □ N/A   Clocks, timers, and switches are properly set.
5. □ Y □ N □ N/A   Outdoor air damper operating properly.
6. □ Y □ N □ N/A   Mixed air thermostat set properly.
7. □ Y □ N □ N/A   Economizer set per specifications.
8. □ Y □ N □ N/A   Fans supplying outdoor air, operate continuously during occupied periods.

Notes: _____

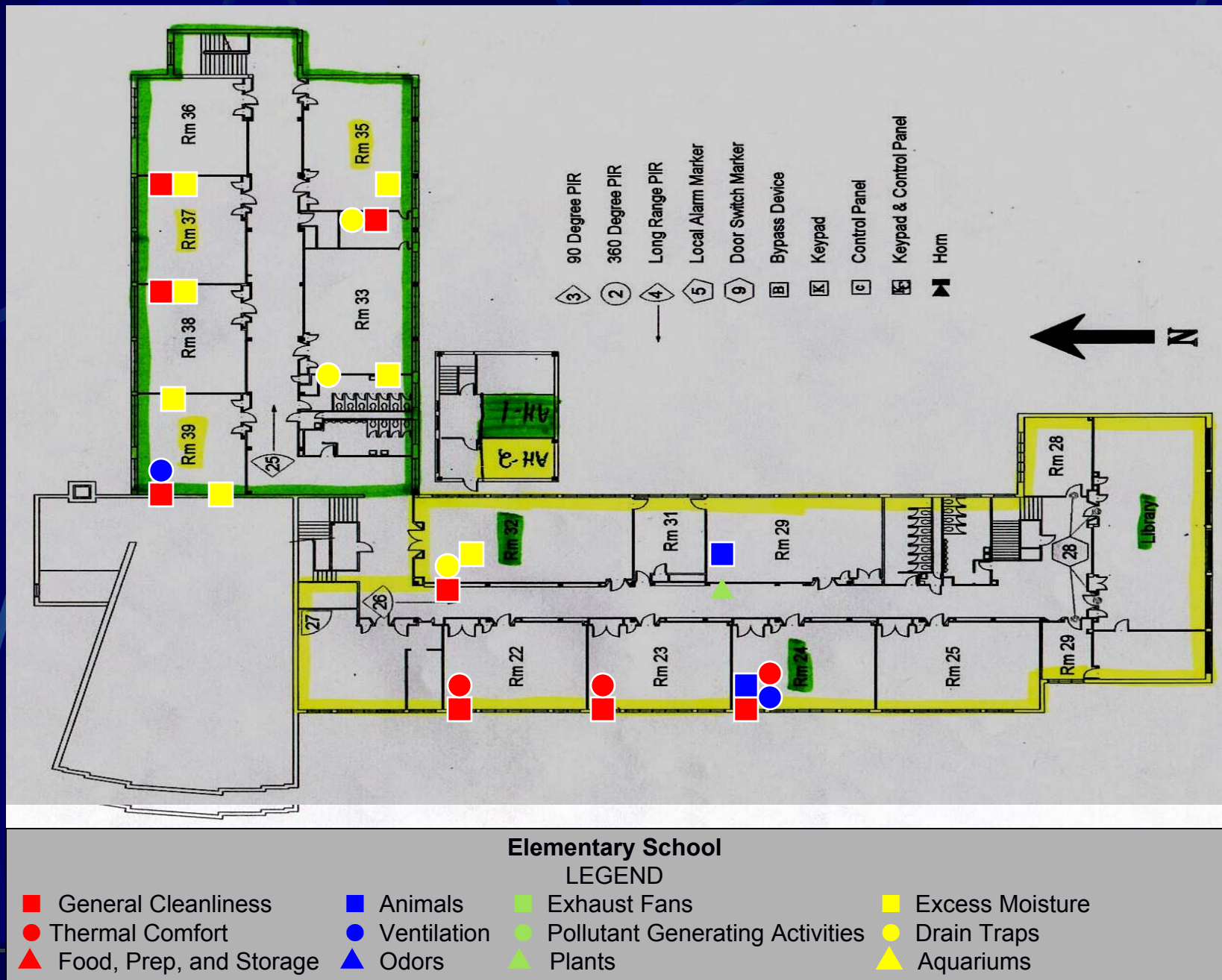| AHU Number	1	2
Outdoor Air Intake		
Free of obstructions	1	2
Outdoor air intakes clear of pollutant source	1	1
Outdoor air moving into intakes	1	2
System Cleanliness		
Filter in good condition, properly installed, free of major air leaks	1	1
Drain pan clean and free of standing water	1	1
Heating and cooling coils clean	1	1
Air handling unit and ductwork clean	1	1
Mechanical room free of trash and chemicals	1	1
Controls for Outdoor Air Supply		
Controls information on hand	1	1
Clock, timers, and switches properly set	1	1
Pneumatic controls okay	1	1
Outdoor air dampeners operating properly	1	1
Freeze-stat reset	1	1
Mixed air thermostat set properly	1	1
Economizer set per specs	1	1
Fans operate properly	1	1
Air Distribution		
Air distribution function per design	1	1

Plots

- **Utilizing data from checklists, plots are developed to determine areas of further investigation during the walk-through phase**
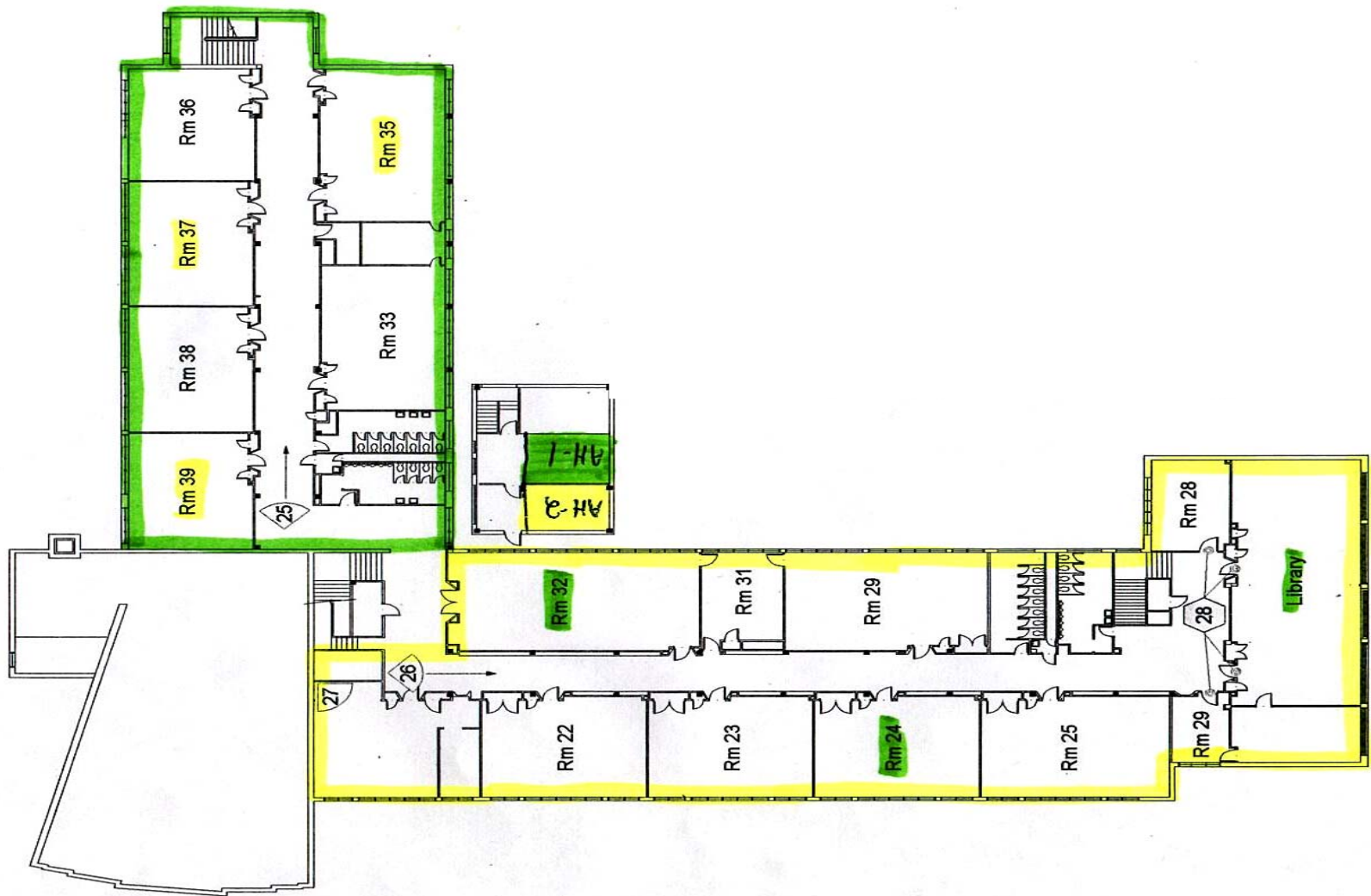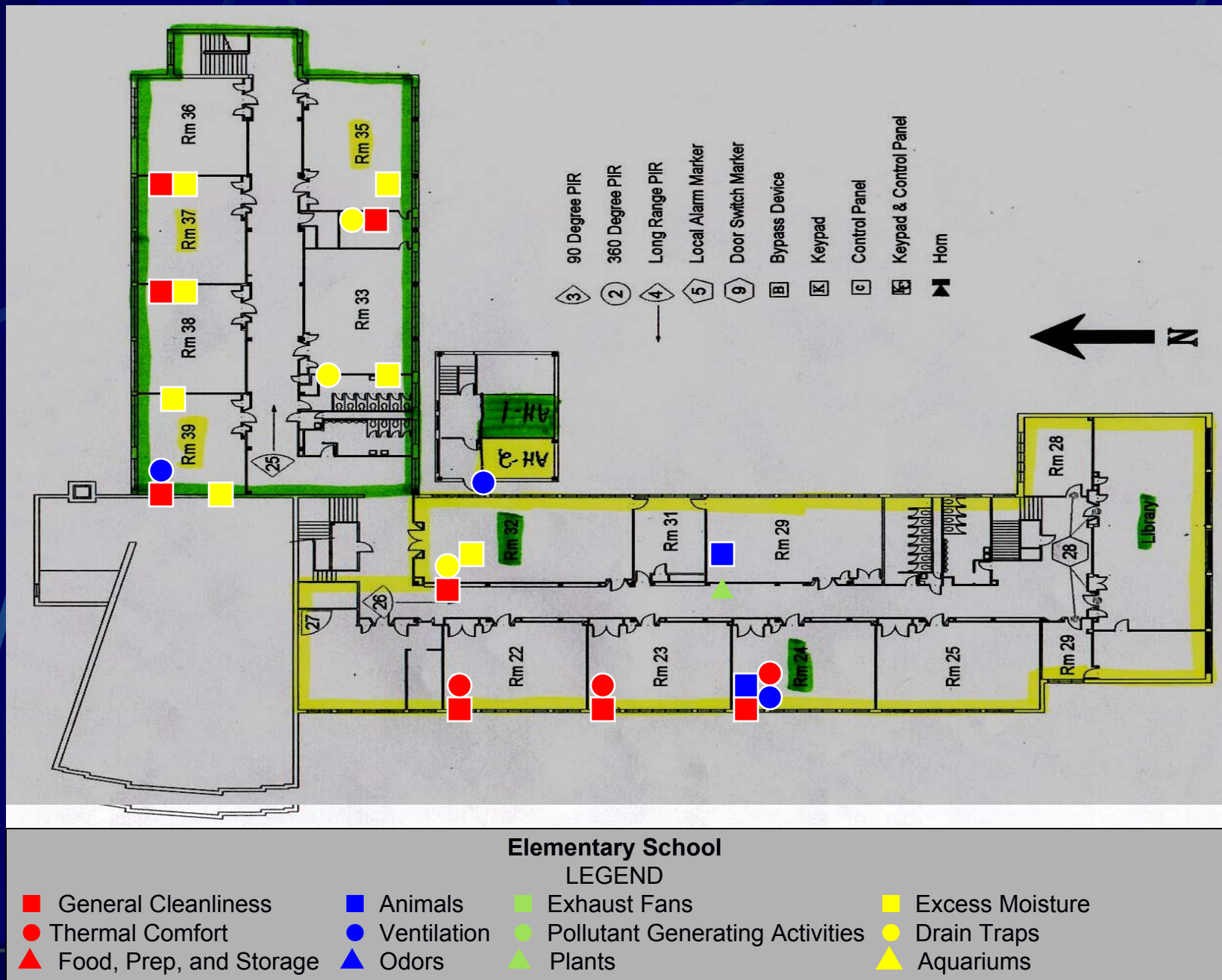
Elementary School
LEGEND

🟥 General Cleanliness	🟦 Animals	🟩 Exhaust Fans	🟨 Excess Moisture
🔴 Thermal Comfort	🔵 Ventilation	🟢 Pollutant Generating Activities	🟡 Drain Traps
🔺 Food, Prep, and Storage	🔺 Odors	🔺 Plants	🔺 Aquariums

Elementary School
LEGEND

■ General Cleanliness	■ Animals	■ Exhaust Fans	■ Excess Moisture	
● Thermal Comfort	● Ventilation	● Pollutant Generating Activities	● Drain Traps	
▲ Food, Prep, and Storage	▲ Odors	▲ Plants	▲ Aquariums	

Occupant checklist information

Elementary School
LEGEND

- 🟥 General Cleanliness
- 🔴 Thermal Comfort
- 🔺 Food, Prep, and Storage
- 🟦 Animals
- 🔵 Ventilation
- 🔺 Odors
- 🟩 Exhaust Fans
- 🟢 Pollutant Generating Activities
- 🔺 Plants
- 🟨 Excess Moisture
- 🟡 Drain Traps
- 🔺 Aquariums

Occupant & Ventilation checklist information

Walk-throughs

- Conducted to validate checklist results

- Further investigate potential problems

Walk-through Data

- CO, CO2, Temperature, & Humidity

- Time of Day, Occupant Information

- Visual Observations

ROOM WALK-THROUGH DATA FORM

School ID _____   **Date** _____

Location _____   **Investigators**_____

Comments _____

LOOK FOR THESE CONDITIONS AND RECORD AS *'OBSERVATIONS'* FOR EACH ROOM:

☐ *Odors: Identifiable or General Stuffiness*   ☐ *Supplies & Chemicals: Cleaning, Pesticides, Crafts*

☐ *Moisture or Mold Damage: Ceiling Tile, Carpets, Walls, Windows*   ☐ *Ventilation: Drafts, Supply or Return Obstructed*

☐ *Carpet: % of Room, Age, Condition*   ☐ *Exhausts: Laboratory, Chemical Storage, Bathroom,*

☐ *General Cleanliness: Dust/dirt, Food Debris, Clutter*   ☐ *Thermostat Location: Near Drafts or Heat Sources*

☐ *Animals: Gerbils, Mice*   ☐ *Lighting: Glare, Inadequate*

☐ *Many Plants*   ☐ *Noise: Ventilators, Outside*

☐ *Copiers, Printers*   ☐ *Unusual Activities*

ROOM #	TIME	CO2: < 1000 ppm?		TEMPERATURE		RH (%) ROOM	ROOM CO ppm	OCCUPANTS	DOORS/WINDOWS
		ROOM	Supply	ROOM	SUPPLY			# RECENTLY	# OPEN

Observations (see above list of examples):

ROOM WALK-THROUGH DATA												
ROOM NUMBER												
CLASSROOMS ARE FREE OF:												
ODORS												
CHEMICAL												
MOLD/MILDEW												
BODY ODOR												
MOISTURE OR MOLD DAMAGE												
CEILING TILE												
CARPET												
WALLS												
WINDOWS												
CARPET												
% OF ROOM												
GENERALCLEANLINESS												
DUST/DIRT												
CLUTTER												
FOOD ITEMS/STORAGE												
FOOD PREPERATION DEVICES												
PLANTS												
ANIMALS OR AQUARIUMS												
ANIMALS												
AQUARIUMS												
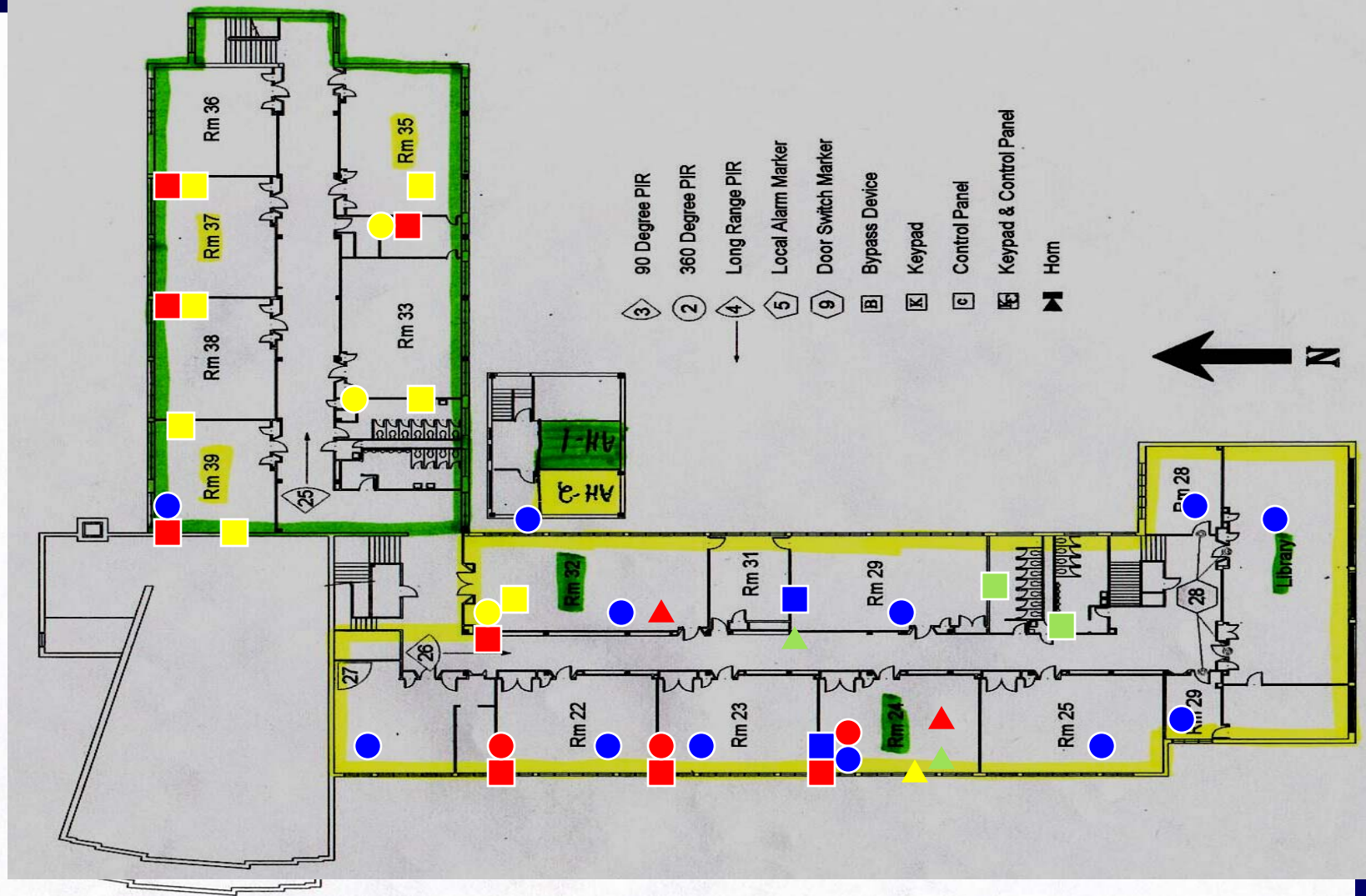
Elementary School
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- 🟢 Pollutant Generating Activities
- 🔺 Plants
- 🟨 Excess Moisture
- 🟡 Drain Traps
- 🔺 Aquariums

Final plots from Walk-Throughs

Summary Report

- Includes final plots, spreadsheets, school-by-school summaries

- Identifies reported items by location

- Explains reasons for concern

- Provides suggestions for correction

Follow-up by the District

- Prioritizing based on district resources
  - Easy to fix, &/or items of immediate concern
  - Issues that may require extra resources
  - Wish list
- Planning for expenditures as necessary
- Long–term plan to institutionalize TFS Program in the district